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A CHECKLIST OF THE VASCULAR PLANTS IN ABBOTT CREEK RESEARCH NATURAL AREA, OREGON¹

by

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ABSTRACT

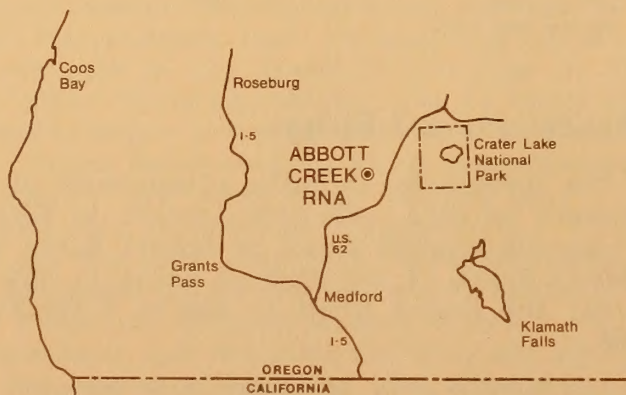
This paper is a checklist of 277 vascular plant taxa that have been collected or encountered in Abbott Creek Research Natural Area, Oregon; a brief description of five forested and two nonforested vegetation types is included.

KEYWORDS: Vascular plants, checklists (vascular plants), Oregon (Abbott Creek Research Natural Area)

INTRODUCTION

Abbott Creek Research Natural Area is located 19 km (12 miles) west of Crater Lake National Park in the Rogue River National Forest of southern Oregon (fig. 1). This Research Natural Area was established on November 18, 1946, as representative of the southwestern Oregon, Sierra-type mixed conifer forests and specifically because it contained excellent stands of sugar pine (*Pinus lambertiana*) (Franklin et al. 1972). The purpose of this note is to document the vascular flora of this Research Natural Area (RNA) to aid future scientific research (Franklin 1970, Moir 1972) and to complement a previous study of forest community composition in the Research Natural Area (Mitchell and Moir 1976).

Figure 1.--Location of Abbott Creek Research Natural Area.



¹ This work was supported by a contract from the Pacific Northwest Forest and Range Experiment Station and the Pacific Northwest Natural Area Committee.

STUDY AREA

Abbott Creek Research Natural Area is located in Douglas and Jackson Counties, and has a total area of 1 076 ha (2,660 acres). Its western border, defined by the main branch of Abbott Creek, provides the easiest access to major portions of the area. An unmaintained logging road parallels the southwestern boundary. This road is reached from U.S. Highway 26 via Forest Road 3047 (fig. 2). The northern border is defined by a ridge between the Rogue and Umpqua River drainages. The main access to this ridge is via trail remnants from Abbott Butte fire lookout, served by Forest Road 2923. The eastern edge of the area generally follows the Golden Stairs Trail, accessible at its southern end by Forest Road 3017 and by Forest Road 3016 at a more northern point. There are no maintained trails or roads within the RNA.

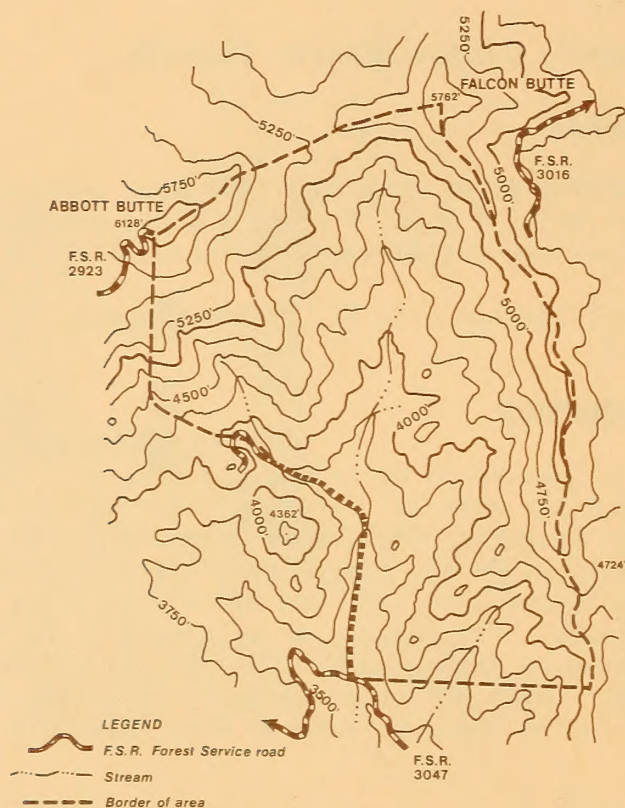


Figure 2.--Features of the Abbott Creek Research Natural Area and vicinity.

Physiography and Geology

The topography is quite steep; much of the area consists of slopes of 25 percent or more. Gentler terrain is found near Abbott Creek and on some high elevation benches south of Abbott Butte and between Abbott and Falcon Buttes. Abbott Butte is the highest point (1 869 m; 6,128 ft) in the Research Natural Area; the lowest point (1 006 m; 3,300 ft) is located in the southwest of the RNA.

The entire area is volcanic in origin. Soils belong to the Freezener-Coyata soil series (Power and Simonson 1969). Typically the soils are acid in reaction and well drained with dark reddish-brown, friable, loam surface layers. Rock fragments range from abundant to less than 30 percent by volume.

Climate

A modified maritime climate characterizes the Research Natural Area. Most of the precipitation results from low pressure systems that move eastward across western Oregon from the Pacific Ocean. During the summers, this dominant climatic feature is modified by high pressure systems that shift fronts northward, resulting in clear, dry weather. This phenomenon results in cool, wet winters and warm, dry summers.

Grazing

The Research Natural Area lies within the Woodruff Cattle and Horse Allotment and presently experiences light grazing on its eastern border.² The USDA Forest Service has issued permits in the area since 1923. As early as the 1860's settlers used the area for grazing. It can be speculated that this grazing has affected the present flora, both through the introduction of species not originally found in the area and through a disproportionate amount of foraging on some of the original species.

VEGETATION TYPES

In the forested locations, 119 reconnaissance plots (Franklin et al. 1970) were used to sample vegetation (Mitchell 1972) and develop a classification. These included transects to determine the percentage of ground cover and frequency of understory species (Daubenmire 1968). Five major forest and two nonforested vegetation types have been recognized (Mitchell and Moir 1976). About 80 percent of the Research Natural Area is forested.

1. The *Abies magnifica* vegetation type located at higher elevations in the northwest corner of the RNA is floristically distinct and belongs to the *Abies magnifica* var. *shastensis* Zone (Dennis 1959, Whittaker 1960, Franklin and Dyrness 1973). The overstory consists of *Abies magnifica*, *Libocedrus decurrens*, *Abies concolor*, and *Tsuga mertensiana*. The understory averages over 80-percent cover and is dominated by *Adenocaulon bicolor*, *Bromus vulgaris*, *Circaea alpina*, *Erigeron aliceae*, *Montia sibirica*, *Osmorhiza chilensis*, *Trientalis latifolia*, *Ribes viscosissimum*, *Rubus parviflorus*, *Smilacina sessilifolia*, *Vancouveria hexandra* and *Vicia americana* which occur in over 67 percent of the locations sampled. The ecoclass is CR F9 (Hall 1978).

2. The *Abies concolor*-*Tsuga heterophylla*/*Acer circinatum*-*Taxus brevifolia* vegetation type is on the moist end of the gradient that includes the three other forested vegetation types that are part of the Mixed-Conifer Zone as it occurs in the RNA (Mitchell and Moir 1976). This vegetation type is found at the bottom of the major drainages, usually where there is a permanent streamflow. *Pseudotsuga menziesii*, *Abies concolor*, *Tsuga heterophylla*, *Pinus lambertiana*, and *Pinus monticola* comprise the overstory. The shrub layer is very well developed; *Acer circinatum*, *Taxus brevifolia*, *Castanopsis chrysophylla*, *Corylus cornuta*, and *Cornus nuttallii* are the most important representatives. The understory is quite dense and is dominated by *Achlys triphylla*, *Berberis nervosa*, *Chimaphila umbellata*, *Linnaea borealis*, *Pachystima myrsinites*, *Trientalis latifolia*, *Vaccinium membranaceum*, and *Whipplea modesta*, all of which occurred in over 78 percent of the locations sampled. The ecoclass is CH 32 (Hall 1978).

²Walker, Gordon J., Range Technician, Prospect Ranger Station, Prospect, Oregon; personal communication, 1979.

3. The *Abies concolor*/*Linnaea borealis* vegetation type occurs on mesic slopes at lower elevations in the RNA. The overstory consists of *Pseudotsuga menziesii*, *Abies concolor*, and *Libocedrus decurrens*. The understory of this vegetation type is very well developed and is dominated by evergreen species. The major understory species are *Achlys triphylla*, *Berberis nervosa*, *Chimaphila umbellata*, *Corylus cornuta*, *Hieracium albiflorum*, *Linnaea borealis*, *Trientalis latifolia*, and *Whipplea modesta* which occur in over 71 percent of the locations sampled. The ecoclass is CW F3 (Hall 1978).

4. The *Abies concolor*-*Pseudotsuga menziesii*/*Whipplea modesta* vegetation type is located on dry midslopes to upper slopes that face south or west. The tree component is dominated by *Pseudotsuga menziesii* and *Libocedrus decurrens*. The understory is poorly developed, often with less than 10-percent total cover. *Castanopsis chrysophylla*, *Amelanchier alnifolia*, and *Garrya fremontii* occasionally provide a shrub layer. *Whipplea modesta* is about the only understory plant with significant cover values in most locations. *Berberis nervosa*, *Chimaphila umbellata*, *Hieracium albiflorum*, *Iris chrysophylla*, and *Trientalis latifolia* are found in 75 percent of the locations sampled. The ecoclass is CW S6 (Hall 1978).

5. The *Pseudotsuga menziesii*-*Libocedrus decurrens*/*Arctostaphylos nevadensis* vegetation type is found mainly on south- and west-facing slopes near ridgetops where there are poorly developed slabby lithosols. The overstory is open and dominated by *Pseudotsuga menziesii* and *Libocedrus decurrens*; *Pinus lambertiana* is also present. The shrub layer is quite well developed and dominated by *Arctostaphylos nevadensis*, *Castanopsis chrysophylla*, *Ceanothus prostratus*, and *Garrya fremontii*, all of which occur in 63 percent or more of the sample locations. The nonshrub component of the understory is quite sparse and is represented by *Arenaria macrophylla*, *Chimaphila umbellata*, *Hieracium albiflorum*, *Trientalis latifolia*, and *Whipplea modesta* which are present in 81 percent or more of the locations sampled. The ecoclass is CD C3 (Hall 1978).

6. A nonforested community occupies dry, rocky sites at midelevations on the western edge of the RNA. This is a very drought resistant and heterogeneous vegetation type. Most of the species are not found on other sites in the RNA. *Brodiaea pulchella*, *Madia minima*, *Perideridia bolanderi*, and *Stipa occidentalis* are the only species that occur in over 30 percent of the locations sampled; the total cover never reaches 50 percent. The ecoclass is GB 29 (Hall 1978).

7. There are several meadows on the northern edge of the Research Natural Area between Abbott and Falcon Buttes. These meadows continue north of the RNA at higher elevations. Snowpack remains as late as June and is followed by rapid growth of dense herbaceous vegetation. *Bromus vulgaris*, *Erigeron aliceae*, *Heracleum sphondylium*, *Hydrophyllum fendleri*, *Lonicera conjugialis*, *Melica spectabilis*, *Osmorhiza occidentalis*, *Pteridium aquilinum*, *Salix scouleriana*, and *Veratrum viride* are dominant members of this vegetation type. There is evidence that these meadows are being invaded by trees, especially *Libocedrus decurrens*. The ecoclass is FW 19 (Hall 1978).

CHECKLIST

Methodology

Specimens were collected of all vascular plants found within the Research Natural Area during the summers of 1971, 1972, and 1973. All specimens were verified by F. J. Hermann, Curator of the USDA Forest Service Herbarium,

Fort Collins, Colorado, or by K. L. Chambers, Curator, Oregon State University Herbarium, Corvallis, Oregon. Voucher specimens were deposited in both herbaria.

The checklist of plants is arranged in alphabetical order by family. The nomenclature follows Peck (1961) but in several instances is updated by Hitchcock and Cronquist (1973). The common names follow various authorities, primarily Franklin and Dyrness (1973) and Garrison et al. (1976). Voucher specimens of most species are on file in the USDA Forest Service Herbarium, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado, or the Oregon State University Herbarium, Corvallis, Oregon.

Most species are given abundance ratings by vegetation type. Some species, however, occupy highly specialized habitats and cannot be related to the seven types.

The checklist of the vascular plants indicate vegetation types where taxa are found, voucher specimen numbers, and the herbaria where deposited. The abbreviations for vegetation types are:

- S -- *Abies magnifica* (Shasta red fir)
- H -- *Abies concolor*-*Tsuga heterophylla*/*Acer circinatum* (western hemlock)
- W -- *Abies concolor*/*Linnaea borealis* (white fir)
- D -- *Abies concolor*-*Pseudotsuga menziesii*/*Whipplea modesta* (Douglas-fir)
- I -- *Pseudotsuga menziesii*-*Libocedrus decurrens*/*Arctostaphylos nevadensis* (incense-cedar)
- R -- Drought-resistant, heterogeneous species
- M -- Herbaceous meadow

The abbreviations for abundance scale are:

- A -- Abundant
- C -- Common
- R -- Rare

Abbreviations for the herbaria where voucher specimens are located are:

- O -- Oregon State University Herbarium, Corvallis, Oregon
- F -- USDA Forest Service Herbarium, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.

Species

Species	Vegetation types							Voucher number	Herbaria	
	S	H	W	D	I	R	M			
ACERACEAE										
<i>Acer circinatum</i> Pursh (vine maple)	A							116		O/F
<i>Acer glabrum</i> Torr. (Rocky Mountain maple)	R							248		O/F
<i>Acer macrophyllum</i> Pursh (bigleaf maple)	C							340		O/F
APOCYNACEAE										
<i>Apocynum androsaemifolium</i> L. (spreading dogbane)						R		267		0
ARISTOLOCHIACEAE										
<i>Asarum caudatum</i> Lindl. (wild ginger)	C	C	C	R	R			57		O/F
BERBERIDACEAE										
<i>Achlys triphylla</i> (Sm.) DC. (deerfoot vanillaleaf)	R	A	A	C	R			164		O/F
<i>Berberis nervosa</i> Pursh (Oregon grape)	R	A	A	A	C			120		0
<i>Vancouveria hexandra</i> (Hook.) Moor. & Dec. (white inside-out-flower)	C	A	A	A	R			145		O/F
BETULACEAE										
<i>Alnus sinuata</i> (Regel) Rydb. (Sitka alder)							R	187		O/F
<i>Corylus cornuta</i> var. <i>Californica</i> (DC.) Sharp (California hazel)	C	A	A	C				143		O/F
BORAGINACEAE										
<i>Cryptantha affinis</i> (Gray) Greene (slender cryptantha)						C		128		O/F
<i>Cynoglossum grande</i> Dougl. ex Lehm. (great hound's tongue)				R				28		O/F
<i>Hackelia jessicae</i> (McGregor) Brand. (Jessica stickweed)							C	182		O/F
<i>Mertensia ciliata</i> (Torr.) G. Don (broadleaved lungwort)				C				16		O/F
CAMPANULACEAE										
<i>Campanula prenanthoides</i> Dur. (California harebell)	R			R				255		O/F
<i>Campanula scouleri</i> Hook. ex A. DC. (Scouler bellflower)	R							271		0
CAPRIFOLIACEAE										
<i>Linnaea borealis</i> var. <i>longiflora</i> Torr. (twinflower)		A	A					161		O/F

Species	Vegetation types										Voucher number	Herbaria
	S	H	W	D	I	R	M					
<i>Lonicera conjugialis</i> Kell. (purpleflower honeysuckle)							R				193	O/F
<i>Sambucus racemosa</i> L. (black elderberry)				R							379	0
<i>Symphoricarpos mollis</i> Nutt. (creeping snowberry)		C	C	R							361	0
CARYOPHYLLACEAE												
<i>Arenaria aculeata</i> Wats. (needle-leaved sandwort)						R					200	O/F
<i>Arenaria macrophylla</i> Hook. (bigleaf sandwort)	A		A	C	A						27	O/F
<i>Silene campanulata</i> Wats. (slender campion)						R					102	O/F
CELASTRACEAE												
<i>Pachystima myrsinites</i> (Pursh) Raf. (Oregon boxwood)	C	A	A			R					168	O/F
COMPOSITAE												
<i>Achillea millefolium</i> ssp. <i>lanulosa</i> Piper (western yarrow)	C						C				140	O/F
<i>Adenocaulon bicolor</i> Hook. (trail plant)	A	C	C	R	R						284	O/F
<i>Agoseris aurantiaca</i> (Hook.) Greene (orange agoseris)							R				328	O/F
<i>Agoseris glauca</i> (Pursh) Raf. (pale agoseris)							R				112, 202	O/F
<i>Agoseris grandiflora</i> (Nutt.) Greene (large-flowered agoseris)							R				265	0
<i>Anaphalis margaritacea</i> (L.) B. & H. (pearly everlasting)							C				259, 306	O/F
<i>Antennaria racemosa</i> Hook. (slender everlasting)		C									24	O/F
<i>Arnica latifolia</i> Bong. (broadleaf arnica)		C									144	O/F
<i>Arnica spathulata</i> Greene (spatulate arnica)				R							291	0
<i>Aster ledophyllus</i> Gray (Cascades aster)							R				319, 383	O/F
<i>Balsamorhiza deltoidea</i> Nutt. (Puget balsamroot)							R				199	O/F
<i>Cirsium centaurea</i> (Rydb.) K. Schum. (slender mountain thistle)									R		382	O/F
<i>Cirsium vulgare</i> (Savi) Airy-Shaw (common thistle)									R		363	O/F
<i>Crepis occidentalis</i> Nutt. (western hawksbeard)						R					196	0
<i>Erigeron aliceae</i> Howell (Alice fleabane)							A				260, 211	O/F
<i>Erigeron foliosus</i> var. <i>confinis</i> (Howell) Jeps. (leafy fleabane)	C										71	O/F
<i>Erigeron inornatus</i> Gray (rayless fleabane)						R					77	O/F
<i>Eriophyllum lanatum</i> var. <i>achillaeoides</i> (DC.) Jeps. (common woolly sunflower)						C					89	O/F

Species	Vegetation types							Voucher number	Herbaria
	S	H	W	D	I	R	M		
<i>Eupatorium occidentale</i> Hook. (western eupatorium)						R		380	O/F
<i>Hieracium albiflorum</i> Hook. (white hawkweed)	C	C	A	A	A			163	O/F
<i>Hieracium cynoglossoides</i> Arv.-Touv. (houndstongue hawkweed)						R		324	O/F
<i>Luina nardosmia</i> (Gray) Cronq.							R	154	O/F
<i>Madia bolanderi</i> Gray (Bolander's tarweed)							A	334	O/F
<i>Madia gracilis</i> (Smith) Keck (common tarweed)						C		37	O/F
<i>Madia minima</i> (Gray) Keck (least tarweed)						C		68	O/F
<i>Petasites frigidus</i> (L.) Fries (alpine coltsfoot)							C	165	O/F
<i>Rudbeckia occidentalis</i> Nutt. (western coneflower)							C	301	O/F
<i>Senecio integerrimus</i> Nutt. (western groundsel)	C					R		35, 197	O/F
<i>Senecio triangularis</i> Hook. (arrowleaf senecio)							C	283, 311	O/F
<i>Solidago canadensis</i> L. (Canada goldenrod)							R	338	O/F
<i>Taraxacum laevigatum</i> (Willd.) DC. (smooth dandelion)						R		149	O
<i>Taraxacum officinale</i> Weber (common dandelion)						R		141	O
CORNACEAE									
<i>Cornus nuttallii</i> T. & G. (Pacific dogwood)	C	C	R	R				113	O/F
CRASSULACEAE									
<i>Sedum oregonense</i> (Wats.) Peck (creamy stonecrop)						C		67	O/F
CRUCIFERAE									
<i>Arabis holboellii</i> var. <i>retrofracta</i> (Grah.) Rydb. (Holboell rockcress)						C		79	O/F
<i>Arabis microphylla</i> Nutt. (littleleaf rockcress)						R		381	O/F
<i>Athysanus pusillus</i> (Hook.) Greene (sandweed)						C		126	O/F
<i>Descurainia richardsonii</i> (Sweet) Schulz (western tansy mustard)						C		315	O/F
CUCURBITACEAE									
<i>Marah oregonus</i> (T. & G.) Howell (Oregon wild cucumber)						R		38	O/F
CUPRESSACEAE									
<i>Libocedrus decurrens</i> Torr. (incense-cedar)	C	C	C	C	C				
CYPERACEAE									
<i>Carex bolanderi</i> Olney (Bolander sedge)		C						2, 368	O/F

Species

	Vegetation types							Voucher number	Herbaria
	S	H	W	D	I	R	M		
<i>Carex concinnoides</i> Mack. (northwestern sedge)								159	F
<i>Carex fracta</i> Mack. (fragile-sheathed sedge)		R		R		R		14, 151, 167, 374	F
<i>Carex hoodii</i> Boott (Hood sedge)				R		R		61, 194, 320	O/F
<i>Carex multicaulis</i> Bailey (thick-fruited sedge)							R	244	F
<i>Carex paucicostata</i> Mack. (few-ribbed sedge)							R	337	F
<i>Carex rossii</i> Boott (Ross sedge)						R		26, 279, 289, 375	O/F
<i>Carex subfusca</i> W. Boott (rusty sedge)		R					R	10, 138, 335	F
EQUISETACEAE									
<i>Equisetum arvense</i> L. (common horsetail)		C						341	O/F
ERICACEAE									
<i>Arctostaphylos nevadensis</i> Gray (pine-mat manzanita)			R		A	R		376	O/F
<i>Arctostaphylos patula</i> Greene (green manzanita)					C			377	O/F
<i>Chimaphila menziesii</i> (R. Br.) Spreng. (little prince's pine)						R		277	O
<i>Chimaphila umbellata</i> (L.) Bart. (western prince's pine)									
<i>Gaultheria ovatifolia</i> Gray (slender gaultheria)	A	C	A	A	A			230	O/F
<i>Pterospora andromedea</i> Nutt. (pine drops)		R	C					285	O/F
<i>Pyrola aphylla</i> Smith (leafless pyrola)			R				R	254, 276, 231	
<i>Pyrola asarifolia</i> Michx. (large pyrola)								342	O/F
<i>Pyrola dentata</i> Smith								153, 290	O/F
<i>Pyrola picta</i> Smith (whitevein pyrola)			R	R	R	R		224, 270	O
<i>Pyrola secunda</i> L. (one-sided wintergreen)			R	R				177, 262	O
<i>Rhododendron macrophyllum</i> G. Don (Pacific rhododendron)			R						
<i>Sarcodes sanguinea</i> Torr. (snow plant)	R	R						359	O/F
<i>Vaccinium membranaceum</i> Hook. (big huckleberry)	R	R						119	O/F
	A	A	A					162	O/F
FAGACEAE									
<i>Castanopsis chrysophylla</i> (Dougl.) A. DC. (golden chinkapin)	A	A	A	A	C			252	O/F

Species	Vegetation types							Voucher number	Herbaria
	S	H	W	D	I	R	M		
<i>Quercus garryana</i> Hook. (Oregon white oak)				R				110, 248	0/F
FUMARIACEAE									
<i>Dicentra formosa</i> (Andr.) Walp. (Pacific bleeding-heart)							R	46	0/F
GARRYACEAE									
<i>Garrya fremontii</i> Torr. (bear bush)					C			239	0/F
GENTIANACEAE									
<i>Swertia umpquaensis</i> (Peck & Appleg.) St. John (Umpqua swertia)	R						C	215, 299	0/F
GRAMINEAE									
<i>Agropyron caninum</i> (L.) Beauv. (bearded wheatgrass)						C		332	0
<i>Agrostis exarata</i> Trin. (spike bentgrass)						C		367	0
<i>Agrostis scabra</i> Willd. (winter bentgrass)							C	323	0/F
<i>Bromus carinatus</i> H. & A. (California brome)						C		210, 238, 295	0/F
<i>Bromus orcuttianus</i> Vas. (Orcutt's brome)							R	241	0/F
<i>Bromus tectorum</i> L. (cheatgrass brome)						C		237	0
<i>Bromus vulgaris</i> (Hook.) Shear (Columbia brome)	C	R					C	233, 286, 317, 388, 393, 268, 278, 282, 178	0/F
<i>Bromus vulgaris</i> var. <i>eximius</i> Shear	R								0/F
<i>Cinna latifolia</i> (Trev.) Griseb. (drooping wood-reed)							R	353	0
<i>Danthonia unispicata</i> (Thurb.) Macoun (one-spike danthonia)						C		40	0
<i>Elymus glaucus</i> Buckl. (blue wildrye)	C						C	131, 218, 246, 281, 296, 322, 369, 385, 390	0/F
<i>Festuca californica</i> Vas. (California fescue)			R				R	109	0/F
<i>Festuca microstachys</i> Nutt. (Nuttall's fescue)				R				236	0
<i>Festuca occidentalis</i> Hook. (western fescue)			R	R			R	123, 235, 269	0/F

Species

	Vegetation types							Voucher number	Herbaria
	S	H	W	D	I	R	M		
<i>Festuca reflexa</i> Buckl. (twoflower fescue)						R		41	O/F
<i>Festuca subulata</i> Trin. (bearded fescue)	R							371	0
<i>Festuca subuliflora</i> Scribn. (crinkleawn fescue)								232, 287	0
<i>Glyceria elata</i> (Nash) Hitchc. (tall manna-grass)		R						372	0
<i>Glyceria striata</i> (Lam.) Hitchc. (fowl manna-grass)		R						347	0
<i>Hierochloa occidentalis</i> Buckl. (California sweetgrass)								153	O/F
<i>Melica aristata</i> Boland. (bearded melic)								263, 389	O/F
<i>Melica californica</i> Scribn. (western melic)						R		394	O/F
<i>Melica harfordii</i> Boland. (Harford's melic)								156	O/F
<i>Melica spectabilis</i> Scribn. (showy onion-grass)						R		198	O/F
<i>Melica subulata</i> (Griseb.) Scribn. (Alaska onion-grass)						R		30, 179, 219, 223, 356, 391	O/F
<i>Phleum alpinum</i> L. (alpine timothy)						R		220	0
<i>Poa pratensis</i> L. (Kentucky bluegrass)						R		330	0
<i>Poa sandbergii</i> Vas. (Sandberg's bluegrass)								245	O/F
<i>Poa scabrella</i> (Thurb.) Vasey (pine bluegrass)					R			33	O/F
<i>Sitanion hystrix</i> (Nutt.) J. G. Sm. (bottlebrush squirreltail)					C			87, 297, 325, 326, 327	
<i>Stipa lemmonii</i> (Vas.) Scribn. (Lemmon needlegrass)						R		34, 354, 355	O/F
<i>Stipa occidentalis</i> Thurb. ex Wats. (Western needlegrass)						C		311	0
<i>Stipa occidentalis</i> var. <i>minor</i> ((Vas.) Hitchc. S. columbiana Macoun) (Columbia needlegrass)						R		66	O/F
<i>Trisetum canescens</i> Buckl. (tall trisetum)							R	280, 392	0
HYDRANGEACEAE									
<i>Whipplea modesta</i> Torr. (whipple vine)	R	C	A	A	C			21	O/F
HYDROPHYLLACEAE									
<i>Hydrophyllum fendleri</i> (Gray) Heller (Fendler waterleaf)							C	192	O/F
<i>Nemophila parviflora</i> Benth. (smallflower nemophila)		C						192	O/F

Species	Vegetation types							Voucher number	Herbaria
	S	H	W	D	I	R	M		
<i>Phacelia hastata</i> Lehm. (whiteleaved phacelia)						R		98	O/F
IRIDACEAE									
<i>Iris chrysophylla</i> Howell (slender-tubed iris)	R	C	C	C	R			25	O/F
JUNCACEAE									
<i>Juncus orthophyllus</i> Cov. (straight-leaved rush)							R	139	O/F
<i>Luzula comosa</i> E. Mey. (hairy woodrush)							C	207, 243	F
<i>Luzula parviflora</i> (Ehrh.) Desv. (millet woodrush)		C					C	17, 316	O/F
LABIATAE									
<i>Agastache urticifolia</i> (Benth.) Kuntze (nettle-leaved giant-hyssop)						R		212, 300	O/F
<i>Monardella odoratissima</i> Benth. (western balm)							R	292	O/F
<i>Scutellaria antirrhinoides</i> Benth. (snapdragon skullcap)							R	107	O/F
<i>Stachys cooleyae</i> Heller (Cooley's hedge nettle)		R						351A, 356	O/F
<i>Stachys rigida</i> Benth. (rigid hedge nettle)		R						351	O/F
LEGUMINOSAE									
<i>Lathyrus polyphyllus</i> T. & G. (Pacific peavine)		R						4	O/F
<i>Lotus formosissimus</i> Greene (Seaside lotus)							R	137	O/F
<i>Lotus nevadensis</i> (Wats.) Greene (Nevada lotus)						R		99	O/F
<i>Lupinus albifrons</i> Lindl. (white-leaved lupine)						R		94	O/F
<i>Lupinus argenteus</i> Pursh (silvery lupine)				R				217	O/F
<i>Lupinus latifolius</i> Agardh (broadleaf lupine)								213	O
<i>Lupinus laxiflorus</i> Lindl. (spur lupine)				R				93	O/F
<i>Trifolium howellii</i> Wats. (bigleaf clover)	C						C	344	O/F
<i>Vicia americana</i> var. <i>villosa</i> (Kell.) F. J. Herm. (American vetch)	C	C	A	C	R			7	O/F
LILIACEAE									
<i>Allium siskiyouense</i> Owns. (Siskiyou onion)						R		203, 204	O
<i>Brodiaea congesta</i> Smith							R	251	O/F
<i>Brodiaea pulchella</i> (Salisb.) Greene (purplehead brodiaea)						R		74	O/F
<i>Calochortus elegans</i> Pursh (elegant mariposa lily)						R		32	O/F

Vegetation types

Herbaria

Species	Vegetation types							Voucher number	Herbaria
	S	H	W	D	I	R	M		
PINACEAE									
<i>Abies concolor</i> Lindl. & Gord. (white fir)	A	C	A	A	C				
<i>Abies magnifica</i> var. <i>shastensis</i> Lemm. (Shasta red fir)	A								
<i>Pinus lambertiana</i> Dougl. (sugar pine)		R	R	R	C				
<i>Pinus monticola</i> Dougl. (western white pine)		R							
<i>Pinus ponderosa</i> Dougl. (ponderosa pine)				R	R				
<i>Pseudotsuga menziesii</i> (Mirb.) Franco (Douglas-fir)		C	A	A	A				
<i>Tsuga heterophylla</i> (Raf.) Sarg. (western hemlock)	R	A	C	R	R				
POLEMONIACEAE									
<i>Collomia grandiflora</i> Dougl. (large-flowered collomia)						R		256	O/F
<i>Collomia heterophylla</i> Hook. (varied-leaved collomia)				R	C			23 305 36	O/F O/F O/F
<i>Gilia aggregata</i> (Pursh) Spreng. (scarlet gilia)							R		
<i>Gilia capitata</i> Sims (globe gilia)						R			
<i>Linanthus harknessii</i> (Curran) Greene (harkness linanthus)						R		100	O/F
<i>Navarretia divaricata</i> (Torr.) Greene (short-stemmed navarretia)						C		43 125	0 O/F
<i>Phlox adsurgens</i> Gray (woodland phlox)									
<i>Phlox diffusa</i> Benth. (sens. E. Wherry) (spreading phlox)						R		205	O/F
<i>Polemonium pulcherrimum</i> Hook. (showy polemonium)		R						53, 206	O/F
POLYGONACEAE									
<i>Eriogonum compositum</i> Benth. var. <i>compositum</i> (northern buckwheat)						C		88	O/F
<i>Eriogonum nudum</i> Benth. (naked eriogonum)						C		78	O/F
<i>Eriogonum umbellatum</i> Torr. var. <i>umbellatum</i> (sulfur buckwheat)						C		130	O/F
<i>Polygonum bistortoides</i> Pursh (American bistort)							C	336	O/F
<i>Polygonum cascadense</i> W. H. Baker (Cascade knotweed)						C		42	O/F
<i>Polygonum majus</i> (Meisn.) Piper (wiry knotweed)						R		70	O/F
<i>Rumex acetosella</i> L. (sheep sorrel)							C	250	O/F

Species	Vegetation types							Voucher number	Herbaria	
	S	H	W	D	I	R	M			
POLYPODIACEAE										
<i>Athyrium filix-femina</i> (L.) Roth (ladyfern)	R	R						346, 364	O/F	
<i>Cheilanthes gracillima</i> D.C. Eat. (lace-fern)						R		76	O/F	
<i>Cryptogramma densa</i> (Bracknr.) Diels (Oregon cliffbreak)						R		82	O/F	
<i>Pellaea glabella</i> Kuhn (cliffbreak)						R		73	O/F	
<i>Polystichum munitum</i> (Kaulf.) Presl. (swordfern)	C	C						352	O/F	
<i>Pteridium aquilinum</i> (L.) Kuhn (bracken fern)	A	C	R				A			
PORTULACACEAE										
<i>Claytonia lanceolata</i> Pursh (lance-leaved spring beauty)							A	45	O/F	
<i>Montia parvifolia</i> (Moc.) Greene (Miner's lettuce)		R						96	O/F	
<i>Montia sibirica</i> (L.) Howell (western spring beauty)	A	C						9	O/F	
<i>Spraguea umbellata</i> Torr. (pussypaws)						R		64	O/F	
PRIMULACEAE										
<i>Trientalis latifolia</i> Hook. (starflower)	A	A	A	A	A			117	O/F	
RANUNCULACEAE										
<i>Actaea rubra</i> (Ait.) Willd. (baneberry)							C	47, 313	O/F	
<i>Anemone deltoidea</i> Hook. (threeleaf anemone)	C	C	R			R		1	O/F	
<i>Aquilegia formosa</i> Fisch. (western columbine)								135	O/F	
<i>Delphinium glaucum</i> Wats. (pale larkspur)							R	304	O/F	
<i>Delphinium menziesii</i> DC. (Menzies' larkspur)	R						R	54	O/F	
RHAMNACEAE										
<i>Ceanothus integrifolius</i> H. & A. (deerbrush)						C		80	O/F	
<i>Ceanothus prostratus</i> Benth. (squawcarpet)					A	C		378	O/F	
<i>Ceanothus velutinus</i> Hook. (varnishleaf ceanothus)					A	C		133	O/F	
RIBESACEAE										
<i>Ribes binominatum</i> Heller (Siskiyou gooseberry)	A					R		171	O/F	
<i>Ribes cruentum</i> Greene (shiny-leaved gooseberry)	R							132, 266	O/F	
<i>Ribes lacustre</i> (Pers.) Poir. (prickly currant)	R							166	O/F	
<i>Ribes lobbii</i> Gray (pioneer gooseberry)						R		181, 257	O/F	
<i>Ribes sanguineum</i> Pursh (winter currant)						R		150	O/F	
<i>Ribes viscosissimum</i> Pursh (sticky currant)	C				R	R		60, 174	O/F	

[illegible]

Species	Vegetation types							Voucher number	Herbaria
	S	H	W	D	I	R	M		
<i>Nimulus breweri</i> (Greene) Rydb. (Brewer monkeyflower)						R		129	O/F
<i>Mimulus guttatus</i> DC. (common monkeyflower)		R						125	O/F
<i>Mimulus pulcherrimus</i> Gray							R	103	O/F
<i>Mimulus tilingii</i> Regel (clustered monkeyflower)								136	O/F
<i>Orthocarpus imbricatus</i> Wats. (mountain owllover)		R						195	O/F
<i>Pedicularis bracteosa</i> Benth. (bracted pedicularis)							C	314	O
<i>Pedicularis racemosa</i> Hook. (sickle-top pedicularis)							R	288	O/F
<i>Penstemon davidsonii</i> (Greene) var. <i>davidsonii</i> Piper (Davidson penstemon)							C		
<i>Penstemon deustus</i> Lindl. (scabland penstemon)						R		97	O/F
<i>Synthyris reniformis</i> (Dougl.) Benth. (snowqueen)						R		91	O/F
		C	R					155	O/F
TAXACEAE									
<i>Taxus brevifolia</i> Nutt. (western yew)		C							
UMBELLIFERAE									
<i>Heracleum sphondylium</i> L. (cowparsnip)	R					C		189	O
<i>Ligusticum apiifolium</i> (Nutt.) Gray (parsleyleaf licoriceroot)							C	209	O
<i>Ligusticum grayi</i> C. & R. (Gray's lovage)							C	209, 312	F
<i>Lomatium nudicaule</i> (Pursh) C. & R. (barestem lomatium)								72	O/F
<i>Lomatium triternatum</i> (Pursh) C. & R. (nineleaf lomatium)						C			
<i>Osmorhiza chilensis</i> H. & A. (mountain sweetroot)						R		111	O/F
<i>Osmorhiza occidentalis</i> (Nutt.) Torr. (sweet anise)	C	C					A	19	O/F
<i>Oxypholis occidentalis</i> C. & R. (western oxypolis)							C	190	O/F
<i>Perideridia bolanderi</i> (Gray) Nels. & Macbr. (mountain false caraway)								348	O/F
<i>Sanicula graveolens</i> Poepp. ex DC. (Sierra snake-root)						A		39	O/F
<i>Sphenosciadium capitellatum</i> Gray (range wolleyhead-parsnip)						R		56, 134	O/F
							C	339	O/F
VALERIANACEAE									
<i>Valeriana sitchensis</i> Bong. (Sitka valerian)							R	221, 308	O/F
VIOLACEAE									
<i>Viola glabella</i> Nutt. (wood violet)	C	A	R	R				49, 226	O/F
<i>Viola sheltonii</i> Torr. (Shelton violet)	R							22	O/F

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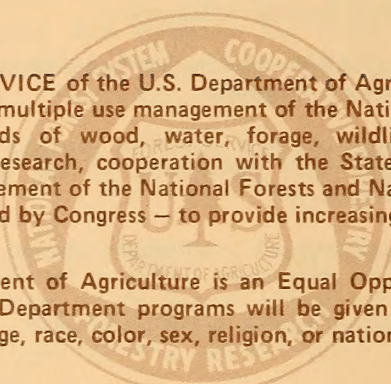
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2. Developing and evaluating alternative methods and levels of resource management.
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